

CALIFORNIA STATE DEPARTMENT OF PUBLIC HEALTH

WALTER M. DICKIE, M.D., Director

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GUY P. JONES
EDITOR

Twenty Years of Sanitary Engineering

By C. G. GILLESPIE, *Chief, Bureau of Sanitary Engineering*

In 1915 the state legislature, harassed by sanitary problems and pursuing the precedent of a few other states, provided a Bureau of Sanitary Engineering in the State Board of Public Health. It has since been maintained with appropriations varying from \$15,000 to \$25,000 per year. The Public Health Act of 1907, providing for a permit system and state approval of plans and sites, has been rigorously applied to sewage disposal projects and as far as time has permitted, the companion Sanitary Water Systems Act has been applied to water supply. Largely as a result and also influenced by the general improvement in sanitary engineering knowledge throughout the country, and the promotion of better sanitation by health officers, water supplies and sewage disposal are far from the plague they once were, as this review will indicate. It is the story of the quiet work of many people throughout the state, with the bureau at its center.

The highlights of accomplishment where contrasts of past and present are striking may be recounted as follows. Prior to 1915 so few sewage treatment plants had the benefit of wise selection of sites and methods of treatment that out of some 82 works built in California up to that time, 45, or over half, have since been abandoned. Out of 181 sewage treatment plants built under state supervision since 1915, only 10 plants have had to be replaced by others. The longer

life of usefulness of so many plants must have been worth huge sums to the cities and towns of the state. So, too, has been the almost total absence of litigation over insanitary sewage disposal and water supply, and also the movement which the state is in peculiar position to foster, whereby communities have joined in the common disposal of their sewage. Nine treatment plants now solve the problem of disposal for 43 communities and spare a large countryside the annoyance of neighboring sewage works.

Through attacks by many agencies, on many fronts, the greatest of which is water disinfection and better laboratory control, typhoid fever epidemics, as derived from water, have almost disappeared, the last water-borne outbreak in California having occurred in 1924. Prior to that time, scarcely a year failed to produce one or more water-borne typhoid outbreaks. Sewage treatment prior to 1915 was limited almost entirely to septic tanks. The designs of the bureau for a trickling filter at Reedley in 1915, and for an activated sludge plant at Folsom Prison in 1917, inaugurated the two most common of the high grade or "complete" processes of sewage treatment to be seen in the state today. Nearly half of the present-day sewage treatment works represent "complete" processes in which not only is the sludge removed from the sewage, but the sewage is rendered clear and odorless. Recently a few plants have also

disinfected the effluent and several have been induced to employ better odor control in the plants. Odorless sewage disposal, now gaining recognition throughout the country, has always been emphasized since the bureau was created.

One hundred forty-three places have put in new sewer systems since 1915 and the state is in a fair way to attain, generally, the convenience of sewerage and plumbing—probably within another twenty years.

By reason of the endemic and epidemic typhoid fever which kept the state alarmed, the first major task in 1915 was to raise the safety of water supplies. The bureau at once established state-wide bacterial control of water systems and largely as an outcome of this many dangerous supplies were abandoned, others protected, and almost 150 places have provided some form of water treatment, the most common of which is water disinfection. The only water purification prior to 1915 was a sort of straining practiced at three or four places and some attempt at water disinfection. There are now 36 filtration plants, about half of which will compare with any in the country. More recently, municipal water softening has appeared. All these water works have a frequent bacterial control through the water department or the health department. It may be hard to realize that in 1915 few water works men were willing to have their water tested.

Cross-connections between private and foreign sources of water are generally considered to represent the last remaining common menace to the purity of water supplies. Not less than 1000 of such connections have been done away with in this state within recent years, under plans prepared or approved by the bureau.

Each year approximately 100 water supplies are reported on for certification to the U. S. Public Health Service, which in turn certifies them by reason of their use on some 300 common carriers.

There are approximately 800 water works and sewer systems in California. These have been inspected at irregular intervals and in 1930 to 1932 all municipal systems, aggregating about 700, were surveyed systematically and fully reported by the bureau. Standards of sewage disposal in state institutions have been brought to a high plane through the concerted planning by the bureau of the State Department of Engineering, which actually builds the works.

State swimming pool sanitation was pioneered in California in 1917. The number of pools is now close to 3000. Almost all the states have followed closely in the path this state has set.

With the city health department of San Francisco,

sanitation of oyster beds, clam beds and shellfish shucking plants was inaugurated here a few years ago. State-wide regulations were devised and we believe the program accounts in large part for the recent reduction of typhoid fever to the vanishing point in San Francisco, the shellfish center of the state.

Mosquito and malaria control has been organized on a wide scale, particularly in the Sacramento and San Joaquin valleys. The malarial fevers and mosquito pests of not many years ago are probably still fresh in many minds.

Rural sanitation has been aided by the distribution of thousands of copies of bulletins giving instructions on rural sewage disposal and water supply, and country homes now generally enjoy piped water and city plumbing. Cropping of sewer farms has been under state regulation since 1917.

Standards of sanitation in the mountain playgrounds have been established on an exceptionally high plane in cooperation with the National Forest Service. The squalid camp grounds and roadsides of fifteen or twenty years ago are seldom seen nowadays. Through the early work of the bureau and the sanitary inspectors, the purity of Lake Tahoe was saved for recreation and water supply. One of the first tasks in 1915 was to undo the running of sewers into the lake, then a common sight at nearly every resort.

In twenty years it is easy to forget the innumerable and notorious instances of stream pollution that plagued the state a generation ago. For example, there was Merced River which was receiving sewage in the heart of Yosemite. Auburn Ravine, below Auburn, was substantially a sewer. Yuba River, opposite the Marysville sewer farm, kept two cities in a turmoil. The blue water of the Feather River, at Oroville, could not be used on account of the taint of sewage. Tuolumne River, below Modesto, was a source of endless complaint. The Sacramento River, at Dunsmuir, was notorious for the piles of sewage along its edge. Kings River, at Reedley, aroused Kings County into an expensive litigation against the city. Sonoma Creek, below Sonoma State Home, was a source of stench through a famous vacation belt. Truckee River, at Truckee and at Floriston, was useless even for fishing. Santa Rosa was suffering under a twenty-seven year old suit by reason of pollution in Santa Rosa Creek. Napa River from Calistoga to its mouth polluted nearby wells, caused offensive odors, and prevented picnicking on its banks. Several of the famous beaches of the state were under quarantine at one time or another. For example, the beaches at Santa Cruz, Capitola, Santa Barbara, Monterey, and the wonderful beaches off Santa

Monica, Venice, Hermosa and Redondo and Long Beach. Recently, a noteworthy dent has also been made in reducing the sewage pollution of San Francisco Harbor through the construction of several sewage treatment works.

There were also many notorious sewer farms and sewage treatment works that no longer occupy the picture. For example, the sewer farm at Pasadena, once the occasion of a complaint by 6000 people; numerous sewer farms in Orange County which were replaced by a joint outfall to the ocean; sewage works right in the towns of Gilroy, East San Jose, College Park, Santa Clara, San Luis Obispo, Yreka and Beverly Hills. There were scores of others of which space does not permit mention.

It is hard to believe that in 1915 cities like Antioch and Pittsburg used river water practically without treatment and at the same time ran their sewage back into the same stream. Imperial Valley and the Mother Lode towns had no treatment of their ditch water, other than passage through small weed grown settling basins. The water supplies of the east bay cities was a source of daily complaint. The same was true of the water supplies at Los Banos, Eureka, and Beverly Hills. Now excellent filtration works, or in some cases simpler devices, have disposed of the problems of all these places, troublesome alike to customer and management.

The work of state sanitation has followed many other trails, more or less related and contributory to those illustrated. For example, there has been much work on the water supplies of the state with reference to iodine and goitre; fluorine and mottled enamel of teeth; behavior of cyanides in water supplies; field and laboratory studies of the various industrial wastes common to this state, particularly canneries, milk plants and beet sugar factories; pollution studies of streams; hundreds of performance tests of water works and sewage treatment works as a means of perfecting and maintaining good operating conditions; mapping nuisances around numerous sewage disposal areas; silicosis hazards in industry, and like tasks. Standards of sanitation for bottled water plants were once devised. Though never adopted, they have been widely distributed and had noteworthy educational influence. An important, in fact indispensable, arm of the bureau has been a sanitary engineering laboratory in which tens of thousands of water samples have been examined and in which test methods have been perfected for the examination of water, sewage and trade wastes. Research into character of these substances and methods has also featured the laboratory work.

One scarcely realizes the massive improvement in

the sanitary engineering environment of the state until viewed in retrospect over such a term of years. In spite of the progress, however, scores of troublesome problems, particularly the expensive and difficult ones, still remain.

EFFICIENCY IN DEATH REGISTRATION

The United States Bureau of the Census, which receives copies of all birth and death certificates that are filed in California, has advised the Division of Vital Statistics that only 1.03 per cent of death certificates were queried in 1934 because of indefinite statements relative to causes of death. That bureau is most meticulous in ascertaining the true cause of death in order that its statistical tabulations may be reliable. California physicians through their efficient reporting of deaths have enabled this state to make a commendable record. With the birth certificates only one-half of 1 per cent of those from California were queried in 1934. It is interesting to note that Massachusetts is the only state that excelled California last year in making this enviable record in the proper filing of both birth and death certificates.

SALVAGE PACKING PLANTS

An outbreak of poisoning due to the use of contaminated bicarbonate of soda occurred in San Francisco recently. This bureau participated with other agencies in an investigation into the cases. It was determined that the active poison ingredient was fluoride salts and that the arsenic discovered in the samples constituted an impurity in the fluoride. Efforts are being made to prohibit the sale of salvaged drug products in San Francisco.

I hope that here in America more and more the ideal of the well-trained and vigorous body will be maintained neck and neck with that of the well-trained and vigorous mind, as the two coequal halves of the higher education for men and women alike. The strength of the British Empire lies in the strength of character of the individual Englishman taken all alone by himself. And that strength, I am persuaded, is perennially nourished and kept up by nothing so much as by the national worship, in which all classes meet, of athletic outdoor life and sport.—William James (1890).

Knowledge is power; the exercise of a self-developed skill is joy; and these are the parents of enthusiasm, which can ward off "the slings and arrows of outrageous fortune," and conquer the world.—Clinical Medicine and Surgery, Dec., 1934.

MORBIDITY

Complete Reports for Following Diseases for Week Ending January 25th, 1936

Chickenpox.

650 cases: Alameda County 2, Albany 2, Berkeley 11, Oakland 32, Chico 1, Colusa 5, Contra Costa County 11, Pittsburg 9, Richmond 2, Placerville 2, Fresno County 15, Fresno 7, Glenn County 1, Humboldt County 2, Calexico 2, Kern County 3, Bakersfield 2, Taft 1, Kings County 3, Los Angeles County 28, Alhambra 3, Beverly Hills 2, Burbank 3, Compton 2, Covina 2, Culver City 1, Glendale 14, Huntington Park 3, Long Beach 2, Los Angeles 77, Montebello 1, Pasadena 1, San Fernando 1, San Gabriel 1, Santa Monica 2, Whittier 11, South Gate 8, Maywood 2, Madera County 2, Madera 1, Merced County 2, Merced 5, Monterey County 1, Pacific Grove 1, Nevada County 1, Orange County 12, Anaheim 3, Orange 7, Santa Ana 14, Laguna Beach 1, Placentia 9, Riverside County 6, Corona 1, Riverside 14, Sacramento County 23, Sacramento 25, San Diego County 15, National City 5, San Diego 28, San Francisco 48, San Joaquin County 9, Stockton 25, Tracy 7, San Luis Obispo County 2, San Luis Obispo 7, San Mateo County 3, Santa Barbara County 3, Lompoc 2, Santa Barbara 4, Santa Clara County 1, Los Gatos 4, Palo Alto 6, San Jose 15, Stanislaus County 1, Modesto 23, Sutter County 3, Tehama County 1, Tulare County 1, Dinuba 3, Ventura County 9, Santa Paula 6, Yolo County 2, Woodland 12.

Diphtheria

45 cases: Berkeley 2, Fresno County 1, Kern County 1, Los Angeles County 2, Huntington Park 1, Inglewood 1, Los Angeles 15, Monterey County 1, Monterey 1, Riverside 1, Sacramento County 3, Sacramento 2, San Diego County 2, National City 1, San Diego 2, Redwood City 3, Santa Barbara County 1, Santa Barbara 1, San Jose 1, Modesto 1, Porterville 1, Yuba County 1.

German Measles

218 cases: Alameda County 34, Berkeley 8, Hayward 18, Oakland 6, Contra Costa County 12, Martinez 2, Pinole 3, Richmond 1, Fresno County 2, Humboldt County 1, Inyo County 1, Bishop 14, Los Angeles County 1, Inglewood 2, Long Beach 16, Los Angeles 10, Pasadena 2, Santa Monica 1, South Gate 1, Napa 1, Orange County 13, Fullerton 1, Orange 1, Santa Ana 16, Tustin 2, Sacramento County 6, Sacramento 9, San Bernardino 1, San Diego County 2, National City 1, San Francisco 23, Menlo Park 1, Santa Clara County 3, Palo Alto 1, Modesto 1, Tulare County 1.

Influenza

150 cases: Oakland 7, Westmoreland 1, Kern County 4, Kings County 14, Hanford 13, Lassen County 10, Los Angeles County 4, Los Angeles 28, Pasadena 1, South Pasadena 1, Whittier 1, Riverside 1, Sacramento 2, San Diego County 28, San Diego 1, San Francisco 14, San Mateo 6, Siskiyou County 1, Dunsmuir 10, Tulare County 1, Dinuba 1, Ventura County 1.

Measles

1031 cases: Alameda County 1, Albany 6, Berkeley 20, Hayward 2, Oakland 45, Butte County 3, Chico 4, Oroville 3, Colusa County 5, Pittsburg 2, Fresno County 47, Fresno 25, Humboldt County 1, Fortuna 2, Imperial County 1, Calexico 7, Kern County 1, Lassen County 2, Los Angeles County 115, Arcadia 2, Beverly Hills 1, Claremont 1, Covina 11, Culver City 1, Glendale 1, Huntington Park 4, Inglewood 4, Long Beach 2, Los Angeles 146, Montebello 3, Pasadena 18, Pomona 10, San Fernando 1, Santa Monica 2, South Pasadena 1, Vernon 3, Whittier 1, Lynwood 2, South Gate 8, Madera County 4, Madera 5, Marin County 6, Yosemite National Park 1, Fort Bragg 90, Merced County 1, Gustine 1, Modoc County 1, Monterey County 29, Carmel 2, Monterey 2, Napa County 2, Napa 3, Newport Beach 1, Riverside County 9, Riverside 5, Sacramento County 41, Sacramento 10, San Benito County 1, Ontario 2, Redlands 1, San Bernardino 4, San Diego County 3, La Mesa 5, San Diego 3, San Francisco 141, San Joaquin County 25, Manteca 11, Stockton 1, San Luis Obispo County 3, Burlingame 3, Daly City 3, San Mateo 3, South San Francisco 13, Santa Barbara County 4, Santa Barbara 9, Santa Maria 1, Santa Clara County 11, Mountain View 1, Palo Alto 2, San Jose 3, Sunnyvale 1, Willow Glen 1, Vallejo 1, Oakdale 1, Riverbank 1, Tulare County 1, Ventura County 22, Filmore 4, Yolo County 5, Woodland 13, Yuba County 1.

Mumps

797 cases: Alameda County 1, Albany 1, Berkeley 3, Oakland 27, Amador County 1, Chico 3, Colusa County 2, Colusa 2, Hercules 1, Pittsburg 1, Richmond 3, Walnut Creek 1, Placer County 1, Fresno County 10, Fresno 12, Calexico 1, Westmoreland 1, Kern County 23, Lassen County 368, Los Angeles County 25, Alhambra 1, Burbank 3, Claremont 7, Huntington Park 2, La Verne 1, Long Beach 27, Los Angeles 42, Pasadena 2, Pomona 19, Santa Monica 5, South Pasadena 1, Whittier 1, Torrance 4, Monterey Park 2, Merced County 3, Monterey County 5, Napa County 1, Orange County 3, Huntington Beach 2, Santa Ana 6, Placentia 1, Riverside County 10, Corona 28, Riverside 9, Sacramento County 4, Sacramento 30, San Bernardino County 1, Ontario 8, San Bernardino 1, San Diego 3, San Francisco 9, San Joaquin County 7, Stockton 7, San Luis Obispo County 1, Santa Barbara County 1, Santa Barbara 4, Santa Clara County 4, Los Gatos 1, San Jose 3, Shasta County 1, Sierra County 2, Siskiyou County 4, Dunsmuir 16, Modesto 2, Oakdale 5, Patterson 3, Sutter County 1, Tehama County 1, Yolo County 4, Winters 1, Woodland 1.

Pneumonia (Lobar)

113 cases: Alameda County 1, Oakland 8, Richmond 1, Fresno 1, Westmoreland 1, Bakersfield 1, Los Angeles County 13, Burbank 2, Culver City 1, Huntington Park 3, Long Beach 1, Los Angeles 39, Pasadena 1, Pomona 1, Santa Monica 1, Torrance 1, West Covina 1, South Gate 2, Gardena 1, Pacific Grove 1, Orange County 1, Fullerton 1, Newport Beach 1, Placentia 1, Corona 1, Riverside 1, Colton 1, San Bernardino 1, San Diego County 1, Escondido 1, La Mesa 2, San Diego 3, San Francisco 11, Lompoc 1, Tulare County 3, Dinuba 1, Ventura County 1.

Scarlet Fever

368 cases: Alameda County 2, Berkeley 1, Oakland 12, Amador County 1, Butte County 2, Chico 4, Colusa County 1, El Dorado County 1, Placerville 2, Fresno County 6, Humboldt County 4, Imperial County 8, Kern County 8, Lassen County 1, Alhambra 5, Beverly Hills 1, Burbank 3, Compton 1, Glendale 2, Huntington Park 2, Long Beach 11, Los Angeles 72, Manhattan 1, Monrovia 1, Montebello 1, Pasadena 5, Pomona 1, Redondo 2, San Gabriel 2, Santa Monica 5, South Gate 1, Gardena 1, Madera County 1, Marin County 1, Merced County 1, Modoc County 1, Pacific Grove 1, Nevada County 1, Nevada City 2, Orange County 5, Anaheim 3, Huntington Beach 2, Orange 1, Santa Ana 1, La Habra 1, Riverside County 7, Riverside 1, Sacramento County 22, Sacramento 17, San Bernardino County 1, Colton 4, Redlands 2, San Bernardino 1, San Diego County 5, San Diego 18, San Francisco 38, San Joaquin County 2, Stockton 8, Redwood City 1, San Bruno 1, Santa Barbara 1, San Jose 1, Petaluma 1, Modesto 2, Oakdale 1, Sutter County 2, Tehama County 1, Red Bluff 4, Tulare County 1, Tulare 1, Ventura County 1, Santa Paula 1, Yolo County 1, Woodland 3, Marysville 2, Los Angeles County 25, San Mateo 1.

Smallpox

No cases reported.

Typhoid Fever

4 cases: Fresno County 1, Los Angeles 1, Riverside County 1, Stanislaus County 1.

Whooping Cough

169 cases: Berkeley 5, Oakland 25, Contra Costa County 1, Fresno County 2, Fresno 3, Kern County 4, Lassen County 3, Los Angeles County 15, Beverly Hills 2, Huntington Park 1, Long Beach 10, Los Angeles 13, Whittier 1, Lynwood 2, Orange County 5, Anaheim 1, Riverside County 1, Riverside 1, Sacramento 2, Redlands 1, San Diego 20, San Francisco 9, San Joaquin County 4, Stockton 9, Tracy 4, San Luis Obispo County 2, Santa Barbara 5, Santa Clara County 1, San Jose 11, Santa Cruz County 2, Vacaville 2, Ventura County 1, Fillmore 1.

Meningitis (Epidemic)

3 cases: Los Angeles 1, San Francisco 1, Tuolumne County 1.

Dysentery (Amoebic)

2 cases: Berkeley 1, Kern County 1.

Dysentery (Bacillary)

One case: Dunsmuir.

Pellagra

One case: Los Angeles.

Poliomyelitis

2 cases: San Francisco 1, Dunsmuir 1.

Trachoma

2 cases: Los Angeles County 1, Sacramento County 1.

Encephalitis (Epidemic)

3 cases: Modoc County 1, San Diego County 1, San Francisco 1.

Hookworm

One case: San Francisco.

Paratyphoid Fever

2 cases: San Marino 1, San Jose 1.

Trichinosis

One case: San Mateo County.

Food Poisoning

4 cases: Los Angeles 1, San Diego 1, Lompoc 2.

Undulant Fever

3 cases: Los Angeles County 1, Santa Ana 1, Tulare County 1.

Actinomycosis

One case: Pasadena.

Coccidioidal Granuloma

One case: Los Angeles County.

Septic Sore Throat (Epidemic)

2 cases: South San Francisco.

Rabies (Animal)

32 cases: Los Angeles County 1, Beverly Hills 1, Compton 3, Huntington Park 1, Long Beach 1, Los Angeles 17, Pasadena 2, South Gate 1, National City 1, Stockton 4.